REMARKS

I. STATUS OF THE CLAIMS

Claims 1-51 are currently pending and are allowed.

II. SUPPORT FOR CLAIMS 19-51

The Office Action indicates that the Applicant must set forth where support can be found for claims 19-51. Therefore, support for each of these claims is set forth below.

Claim 19 recites an apparatus comprising: an optical splitter (see, for example, splitter 15 in FIGS. 2 and 11, and the disclosure in column 5, lines 3-5, and column 11, lines 42-54, of the specification) splitting off a portion of an input light having been amplified as the input light traveled through an optical fiber (see, for example, first optical fiber amplifier 2 in FIG. 1 and optical fiber 51 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification) via first pumping light (see, for example, excitation light from light source 52 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification) traveling through the optical fiber in an opposite direction than the input light, the first pumping light being controlled in accordance with a monitored optical power of said split portion (see, for example, control circuit 56 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification); and an optical fiber amplifier (see, for example, second optical fiber amplifier 3 in FIG. 1 and optical fiber 12 in FIG. 11, and the disclosure in column 3, line 64, through column 4, line 1, and column 11, lines 42-54, of the specification), optically connected to the optical splitter, amplifying the input light having said portion split off therefrom via second pumping light (see, for example, excitation light from light source 54 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification). Moreover, claim 19 recites that, when the first pumping light is not being supplied to the optical fiber and is thereby not traveling through the optical fiber, a loss in the optical fiber is less than a difference between a minimum light level prescribed in a system in which the optical amplifier is installed and a minimum light level of the split portion that can be monitored (see, for example, FIGS. 1 and 2, and the disclosure in column 4, lines 7-24, and column 8, lines 4-9; and FIG. 11 and the disclosure in column 11, lines 42-54, of the specification).

Claim 20 recites that the optical fiber amplifier is a rare earth-doped optical fiber amplifier (see, for example, second optical fiber amplifier 3 in FIG. 1 and optical fiber 12 in FIG. 11, and the disclosure in column 3, line 64, through column 4, line 1, and column 11, lines 42-54, of the specification).

Claim 21 recites optical isolator between the optical splitter and the optical fiber amplifier (see, for example, optical isolator 21c in FIG. 11, and the disclosure in column 11, lines 62-65, of

the specification).

Claim 22 recites a monitor monitoring the optical power of said split portion, to thereby provide said monitored optical power (see, for example, photodiode 16 and control circuit 56 in FIG. 11, and the disclosure in column 11, lines 52-54, of the specification).

Claim 23 recites a monitor monitoring the optical power of said split portion, to thereby provide said monitored optical power (see, for example, photodiode 16 and control circuit 56 in FIG. 11, and the disclosure in column 11, lines 52-54, of the specification).

Claim 24 recites a monitor monitoring the optical power of said split portion, to thereby provide said monitored optical power (see, for example, photodiode 16 and control circuit 56 in FIG. 11, and the disclosure in column 11, lines 52-54, of the specification).

Claim 25 recites that the optical fiber is an erbium doped fiber (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 26 recites that there are no optical components between the optical splitter and the optical fiber amplifier (see, for example, FIGS. 2, 6, 9 and 10, where there are no optical components between splitter 15 and the input to optical fiber 12).

Claim 27 recites an optical splitter (see, for example, splitter 15 in FIGS. 2 and 11, and the disclosure in column 5, lines 3-5, and column 11, lines 42-54, of the specification) splitting off a portion of an input light having been amplified as the input light traveled through an optical fiber (see, for example, first optical fiber amplifier 2 in FIG. 1 and optical fiber 51 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification) via first pumping light (see, for example, excitation light from light source 52 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification) traveling through the optical fiber in an opposite direction than the input light, the first pumping light being controlled in accordance with a monitored optical power of said split portion (see, for example, control circuit 56 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification); and an optical fiber amplifier (see, for example, second optical fiber amplifier 3 in FIG. 1 and optical fiber 12 in FIG. 11, and the disclosure in column 3, line 64, through column 4, line 1, and column 11, lines 42-54, of the specification) amplifying the input light having said portion split off therefrom via second pumping light (see, for example, excitation light from light source 54 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification). Moreover, claim 27 recites that, when the first pumping light is not being supplied to the optical fiber and is thereby not traveling through the optical fiber, a loss in the optical fiber is less than a difference between a minimum light level prescribed in a system in which the apparatus is installed and a minimum light level of the split portion that can be monitored (see, for example, FIGS. 1 and 2, and the disclosure in column 4, lines 7-24, and

column 8, lines 4-9; and FIG. 11 and the disclosure in column 11, lines 42-54, of the specification).

Claim 28 recites that the optical fiber amplifier is a rare earth-doped optical fiber amplifier (see, for example, second optical fiber amplifier 3 in FIG. 1 and optical fiber 12 in FIG. 11, and the disclosure in column 3, line 64, through column 4, line 1, and column 11, lines 42-54, of the specification).

Claim 29 recites an optical isolator between the optical splitter and the optical fiber amplifier (see, for example, optical isolator 21c in FIG. 11, and the disclosure in column 11, lines 62-65, of the specification).

Claim 30 recites a monitor monitoring the optical power of said split portion, to thereby provide said monitored optical power (see, for example, photodiode 16 and control circuit 56 in FIG. 11, and the disclosure in column 11, lines 52-54, of the specification).

Claim 31 recites a monitor monitoring the optical power of said split portion, to thereby provide said monitored optical power (see, for example, photodiode 16 and control circuit 56 in FIG. 11, and the disclosure in column 11, lines 52-54, of the specification).

Claim 32 recites that the optical fiber is an erbium doped fiber (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 33 recites that there are no optical components between the optical splitter and the optical fiber amplifier (see, for example, FIGS. 2, 6, 9 and 10, where there are no optical components between splitter 15 and the input to optical fiber 12).

Claim 34 recites an optical splitter (see, for example, splitter 15 in FIGS. 2 and 11, and the disclosure in column 5, lines 3-5, and column 11, lines 42-54, of the specification) splitting off a portion of an input light having been amplified via first pumping light (see, for example, excitation light from light source 52 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification) traveling in an opposite direction than, and along the same travel path as, the input light, the first pumping light being controlled in accordance with a monitored optical power of said split portion (see, for example, control circuit 56 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification); and an optical fiber amplifier (see, for example, second optical fiber amplifier 3 in FIG. 1 and optical fiber 12 in FIG. 11, and the disclosure in column 3, line 64, through column 4, line 1, and column 11, lines 42-54, of the specification), optically connected to the optical splitter, amplifying the input light having said portion split off therefrom via second pumping light (see, for example, excitation light from light source 54 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification). Moreover, claim 34 recites that, when the first pumping light is not being supplied and is thereby not traveling in an opposite

direction than, and along the same travel path as, the input light, a loss in the travel path is less than a difference between a minimum light level prescribed in a system in which the apparatus is installed and a minimum light level of the split portion that can be monitored (see, for example, FIGS. 1 and 2, and the disclosure in column 4, lines 7-24, and column 8, lines 4-9; and FIG. 11 and the disclosure in column 11, lines 42-54, of the specification).

Claim 35 recites an optical isolator between the optical splitter and the optical fiber amplifier (see, for example, optical isolator 21c in FIG. 11, and the disclosure in column 11, lines 62-65, of the specification).

Claim 36 recites a monitor monitoring the optical power of said split portion, to thereby provide said monitored optical power (see, for example, photodiode 16 and control circuit 56 in FIG. 11, and the disclosure in column 11, lines 52-54, of the specification).

Claim 37 recites a monitor monitoring the optical power of said split portion, to thereby provide said monitored optical power (see, for example, photodiode 16 and control circuit 56 in FIG. 11, and the disclosure in column 11, lines 52-54, of the specification).

Claim 38 recites that there are no optical components between the optical splitter and the optical fiber amplifier (see, for example, FIGS. 2, 6, 9 and 10, where there are no optical components between splitter 15 and the input to optical fiber 12).

Claim 39 recites that the optical fiber is doped with a rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 40 recites that the optical fiber is doped with a rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 41 recites that the optical fiber is doped with a rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 42 recites that the optical fiber is doped with a rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 43 recites that the optical fiber is doped with a rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 44 recites that the optical fiber is doped with a rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 45 recites that the optical fiber is doped with a rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 46 recites that the optical fiber is doped with a rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 47 recites an apparatus for receiving an optical signal transmitted through an

optical fiber (see, for example, optical fiber 51 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification) in a first direction, comprising: a pumping light source to output a pumping light to the optical fiber so that the pumping light travels through the optical fiber in a second direction opposite to the first direction (see, for example, excitation light from light source 52 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification); an optical coupler (see, for example, splitter 15 in FIGS. 2 and 11, and the disclosure in column 5, lines 3-5, and column 11, lines 42-54, of the specification) to receive the optical signal from the optical fiber and to output the received optical signal and a monitor signal of the received optical signal , the pumping light source being controlled in accordance with the monitor signal to thereby control the pumping light output by the pumping light source (see, for example, control circuit 56 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification); and an optical amplifier to amplify the received optical signal output from the optical coupler (see, for example, second optical fiber amplifier 3 in FIG. 1 and optical fiber 12 in FIG. 11, and the disclosure in column 3, line 64, through column 4, line 1, and column 11, lines 42-54, of the specification). Moreover, claim 47 recites that, when the pumping light is not being output by the pumping light source and the pumping light is thereby not traveling through the optical fiber, a loss in the optical fiber is less than a difference between a minimum light level prescribed in a system in which the apparatus is installed and a minimum light level of the monitor signal that can be monitored (see, for example, FIGS. 1 and 2, and the disclosure in column 4, lines 7-24, and column 8, lines 4-9; and FIG. 11 and the disclosure in column 11, lines 42-54, of the specification).

Claim 48 recites that the optical fiber is doped with a rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 49 recites an optical transmitting station (inherent upstream of connector 20a in FIG. 11) to transmit an optical signal through an optical fiber in a first direction; and an optical repeater (see, for example, column 1, lines 23-26, and column 7, lines 32-34, of the specification), coupled to the optical fiber. Claim 49 recites that the optical repeater includes a pumping light source to output a pumping light to the optical fiber so that the pumping light travels through the optical fiber in a second direction opposite to the first direction (see, for example, excitation light from light source 52 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification), an optical coupler (see, for example, splitter 15 in FIGS. 2 and 11, and the disclosure in column 5, lines 3-5, and column 11, lines 42-54, of the specification) to receive the optical signal from the optical fiber and to output the received optical signal and a monitor signal of the received optical signal, the pumping light source being controlled in

accordance with the monitor signal to thereby control the pumping light output by the pumping light source (see, for example, control circuit 56 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification) and an optical amplifier (see, for example, second optical fiber amplifier 3 in FIG. 1 and optical fiber 12 in FIG. 11, and the disclosure in column 3, line 64, through column 4, line 1, and column 11, lines 42-54, of the specification) to amplify the received optical signal from the optical coupler and to output the amplified optical signal. Moreover, claim 49 recites that, when the pumping light is not being output by the pumping light source and is thereby not traveling through the optical fiber, a loss in the optical fiber is less than a difference between a minimum light level prescribed in a system in which the optical repeater is installed and a minimum light level of the monitor signal that can be monitored (see, for example, FIGS. 1 and 2, and the disclosure in column 4, lines 7-24, and column 8, lines 4-9; and FIG. 11 and the disclosure in column 11, lines 42-54, of the specification).

Claim 50 recites that the optical fiber is doped with an rare earth element (see, for example, column 11, lines 51-52, and column 4, lines 46-48, of the specification).

Claim 51 recites an optical repeater (see, for example, column 1, lines 23-26, and column 7, lines 32-34, of the specification), coupled to an optical fiber (see, for example, first optical fiber amplifier 2 in FIG. 1 and optical fiber 51 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification) through which an optical signal is transmitted in a first direction, including: a pumping light source (see, for example, excitation light from light source 52 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification) to output a pumping light to the optical fiber so that the pumping light travels through the optical fiber in a second direction opposite to the first direction, an optical coupler (see, for example, splitter 15 in FIGS. 2 and 11, and the disclosure in column 5, lines 3-5, and column 11, lines 42-54, of the specification) to receive the optical signal from the optical fiber and to output the received optical signal and a monitor signal of the received optical signal, the pumping light source being controlled in accordance with the monitor signal to thereby control the pumping light output by the pumping light source (see, for example, control circuit 56 in FIG. 11, and the disclosure in column 11, lines 42-54, of the specification), and an optical amplifier (see, for example, second optical fiber amplifier 3 in FIG. 1 and optical fiber 12 in FIG. 11, and the disclosure in column 3, line 64, through column 4, line 1, and column 11, lines 42-54, of the specification) to amplify the received optical signal output from the optical coupler; and an optical receiver (inherent downstream of connector 20b in FIG. 11), operatively coupled to the optical repeater, to receive the amplified optical signal. Moreover, claim 51 recites that, when the pumping light source is not outputting the pumping light so that the pumping light is thereby not traveling through the optical fiber, a

loss in the optical fiber is less than a difference between a minimum light level prescribed in a system in which the optical repeater is installed and a minimum light level of the monitor signal that can be monitored (see, for example, FIGS. 1 and 2, and the disclosure in column 4, lines 7-24, and column 8, lines 4-9; and FIG. 11 and the disclosure in column 11, lines 42-54, of the specification).

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Various portions of the application are set forth herein as providing support for various claim recitations. However, the claims are not limited to being supported by these portions of the application. Instead, other portions of the application may also provide support for the claim recitations.

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In view of the above, it is respectfully submitted that all the requirements set forth in the Office Action are satisfied.

III. CONCLUSION

In view of the above, it is respectfully submitted that the application is in condition for allowance, and a Notice of Allowance is earnestly solicited.

If any further fees are required in connection with the filing of this response, please charge the fees to our Deposit Account No. 19-3935.

Respectfully submitted,

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